



# RC1000



## Dual-Channel Up/Down Timer User Manual

# Table of Contents

Introduction .....	2
1 Features and Specifications .....	4
1.1 INPUTS .....	4
GPI Inputs.....	4
1.2 OUTPUTS .....	5
GPI Outputs.....	5
RS232 Interface .....	5
FRONT PANEL DISPLAY.....	5
1.3 MECHANICAL.....	6
Electrical.....	6
1.4 ENVIRONMENTAL .....	6
2 Unpacking and Installation .....	7
2.1 Package Contents .....	7
2.2 Connections .....	8
Figure 1. RC1000 Rear Panel.....	8
Figure 2. I/O Connector (25 Pin 'D').....	8
Figure 3. Breakout Adapter .....	8
2.3 Timecode Connections .....	10
Applying power to the RC1000 .....	13
3 Operation .....	14
3.1 Entering Time and Direction .....	16
3.2 Programming PRESETs.....	17
3.3 Recalling PRESETs .....	18
3.4 Elapsed Time.....	19
3.5 Sending Time to Remote Display with RS-232.....	21
3.6 Stopping and Restarting (Pause) .....	22
3.7 Reversing the Direction of the Count .....	24
3.8 Displaying Input Timecode .....	24
3.9 Countdown to End of Program (Input Timecode Required) .....	25
3.10 Returning to Input Timecode After Countdown (Input Timecode Required).....	26
3.11 Swapping Channels .....	26
3.12 Adding/Subtracting Time to Existing/Running Count .....	27
3.13 Adding or Subtracting Time (Small Increments) .....	28
3.14 Calculator .....	29
3.15 Sequence of Countdowns (Follow Buffer) .....	30
3.15 Sequence of Countdowns (Follow Buffer) - (Continued) .....	31
3.16 Disabling Display Selection.....	33
3.17 Disabling channel Selection.....	33
3.18 Programming GPI Outputs .....	34
3.19 Programming GPI Inputs .....	36
Example 1. Configure GPI input 1 to trigger a count down from 60seconds on Channel A.....	37
Example 2. Configure GPI input 2 to trigger a count up from 0seconds on Channel B.....	39
3.20 Brightness of Display .....	41
3.21 Leading Zero Blanking .....	41
3.22 Re-enabling Lead Zeros .....	41

## Introduction

Thank you for your purchase of a RC1000 Up/Down Timer from Masterclock. Here you'll find instructions for unpacking and installing your device, proper care and configuration.

The RC1000 is a dual-channel up/down timer for production and control applications. This extremely versatile and functional device is essentially two counters in one. Counts are entered via a numeric keypad and a new count can be started during a current count or after it has stopped. It can be programmed with 20 channel presets or counts can be calculated or entered during production. The six-digit dual display can show HH:MM:SS or MM:SS:FF. Each channel generates time code to sync production equipment or for displaying counts on our TCDS Series of digital clocks or any clock that accepts raw SMPTE/EBU. In addition, the RC1000 has network capability and can be used for displaying counts on any Masterclock network NTDS clock (with firmware or above).

We are here to help. You can reach us using various contact methods (phone, email, etc.) found at our website: [www.masterclock.com](http://www.masterclock.com)

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# 1 Features and Specifications

## 1.1 INPUTS

### Timecode

Input Selection	Automatic Time Code Detection
Input Range	Automatic Gain Adjust
Type	Single Ended Unbalanced (SE) or Differential Balanced (DIFF)
Impedance	>10 kΩ
SMPTE / EBU	24, 25, 30 fps NDF, & 29.97 DF
Level	0.2-18 Vpp (2Vpp nom)
IRIG – B0	DCLS, PWM
Level	0.5-12Vp (5Vp Nom)
IRIG-B1	Amplitude Modulated
Level	0.5 – 8 Vpp (5 Vpp nom)

### Keypad

Presets	20 Channel Independent Programmable with Recall
Start/Stop	Anytime
Chaining (Follow) Buffer	8 Sequences Deep per Channel
Time Calculations	Addition & Subtraction (Stand-alone or to a Channel)
One-Key Calculations	Single Frame or Single Second Increment or Decrement

4

### GPI Inputs

Quantity	2
Type	General Purpose Interface Input Opto-Isolated Normally Open, Closure to 0VDC return
Level	Vpp +/- dB
Minimum Closure Duration	40 mSec
Delay Between Closures	40 mSec
Programmability	Any PRESET

### Network

Connector	RJ45
Type	10/100 MB
Protocols Supported	NTP v3, v4 Client, DHCP v4, v6 for automatic acquisition of network address, name servers, and time servers IPv4, IPv6 compatible SNMP v1,2.2, 3 with custom MIB Telnet (disabled by default) SSH

## 1.2 OUTPUTS

### SMPTE/EBU Timecode

Quantity	2: Channel A & Channel B, Independent
SMPTE / EBU	24, 25, 30 fps NDF, & 29.97 DF
Type	Single Ended (Unbalanced) or Differential (Balanced)
Level	2.3 Vpp / +12 dBm unloaded (high impedance)
	2.3 Vpp @ 600 $\Omega$ load
	2.2 Vpp @ 75 $\Omega$ load
	2.15 Vpp / +10 dBm into 50 $\Omega$ load

### GPI Outputs

Quantity	2
Type	General Purpose Interface Output Opto-Isolated Normally Open, Closure to 0 VDC return
Off State Voltage Level	+4V DC pullup through 10 k $\Omega$
Closure Activation	Any time match or sequence endpoint
Closure Duration	Programmable, 40 mSec to 1sec (0-25 frames)
Max Current Draw	250 mA

### RS232 Interface

Interface	RS232 Levels
Type	Data Set
Setup	9600 Baud, 8 Bits, 1 Stop, No Parity
Format	Continuous HH:MM:SS or HH:MM:SS.FF

### Front Panel Display

Quantity	2 Time Readouts
Type	6 Digit, 7 Segment
Readout Formats	Hours:Minutes:Seconds Minutes:Seconds.Frames
Display Format	12 hour or 24 hour
Rollover/Rollunder	23:59:29 and 00:00:00:00 respectively
Leading Zero Blanking	Yes
Brightness	User Selectable

## 1.3 MECHANICAL

### Dimensions

Width	5.2", 13.2 cm
Length	8.0", 20.3 cm
Height	1.75 ", 4.4 cm at deepest point
Weight	1.8 lb., 0.82 kg

### Electrical

Power	Dual Supply – Internal backup power selection in event of loss of either DC or PoE.  DC Locking Connector, 2.1 mm Male Jack +8-28 VDC, 250 mA, external 90-240 VAC Input to 24VDC Output Switching Power Supply included or RJ45 Connector pins PoE, +48 VDC per IEEE 802.3af
Signal	DB25 Connector – Time Code I/O, GPI, GPO RJ45 – 10/100 MB Ethernet Network USB -Type A

## 1.4 ENVIRONMENTAL

### Operational

Temperature	0 to 60 Deg C
Humidity	0 to 90% Non-condensing

### Storage

Temperature	-32 to 85 Deg C
Humidity	0 to 90% Non-condensing

## 2 Unpacking and Installation

### 2.1 Package Contents

The RC1000 Up/Down Timer is fully tested before shipment to ensure trouble-free service. Please check the equipment for any visible damage which may have been caused during transit. Please verify that the following package contents were received.

RC1000 Up/Down Timer Unit



AC to DC power supply with locking connector



DB25 to Terminal Block Adapter



WinDiscovery CD



Cat 5E Ethernet Cable



\*\*Optional PoE (Power over Ethernet)  
Single Port Injector

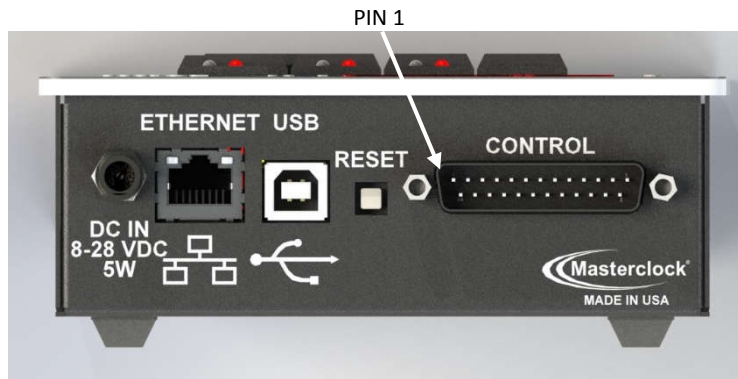
\*\*Ordered Separately



\*\*

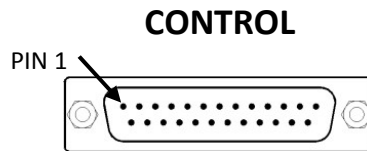
## 2.2 Connections

Connections to the RC1000 are made on the rear panel of the device. Signal and control connections should be made before connecting the power for the RC1000.



**Figure 1. RC1000 Rear Panel**

The primary timing, signal, and control connection interface for Time Code Input, Time Code Output, General Purpose Interface Inputs & Outputs, and the RS232 serial communications is via the 25 pin DB25 connector, labeled “CONTROL”, on the rear of the unit. The DB25 is arranged in 25 pins of two rows. When viewed from the rear, as shown in Figures 1 & 2, Pin 1 of the DB25 connector, is located at the upper left-hand corner.



**Figure 2. I/O Connector (25 Pin ‘D’)**


A DB25 breakout adapter with push insert terminal block connects has been included with the RC1000 to allow quick connection and configuration of the wiring. The breakout adapter board is numbered with each terminal block input corresponding to the DB25 pin number of the RC1000 Control connector. Note: An additional terminal block connection, label “G” is connected to the metal “shield” of the DB25 breakout adapter, which in turn connects to the DB25 connector and the case of the RC1000. This connection may be used to extend the shield of the signal cabling.



**Figure 3. Breakout Adapter**



Table 1 contains the pin outs of the external I/O connector. Table 1 has been color coded to show the grouping of the signals relative to the closest signal ground/signal return pin of the I/O connector.

<b>Signal</b>	<b>25 Pin D Connector Pin#</b>	<b>26 Position Terminal Block Connector # (of DB25 Breakout Adapter)</b>
		
Ground	1	1
RS-232 TX	2	2
RS-232 RX	3	3
Ground	4	4
Ground	5	5
Ground	6	6
Ground	7	7
Timecode Input +	8	8
Ground	9	9
Primary (Channel A) TC Out +	10	10
Ground	11	11
Secondary (Channel B) TC Out +	12	12
Ground	13	13
Spare (No Connect)	14	14
Ground	15	15
GP Input #0	16	16
GP Input #1	17	17
GP Output #0	18	18
GP Output #1	19	19
Spare (No Connect)	20	20
Timecode Input -	21	21
Spare (No Connect)	22	22
Primary (Channel A) TC Out -	23	23
Spare (No Connect)	24	24
Secondary (Channel B) TC Out -	25	25
Shield Ground	Outer Shell	26 (G)

**TABLE 1. I/O CONTROL Connector Pinout**

## 2.3 Timecode Connections

The basic timecode input and output connections are detailed below.

Single Ended (SE) unbalanced such as those distributed by 50  $\Omega$  coax or twisted pair cable can be connected using the center pin to the TC+ (Timecode Signal), and the outer conductor (signal return) to the closest signal ground/return pin of the I/O connector.

Differential (DIFF) signals are considered balanced, and should be distributed with twisted shielded pair, Twinax, or Triax cables if possible. Differential signals which use the TC+ and TC- signals, may also be distributed with an additional signal reference /return. If a separate shield is present on the wire bundle, it may also be connected to the signal ground of the system which may be the outer shell of the connector, or if using the 25 pin Terminal Block adapter, connection # 26, to reduce noise. However, the shield wire should be terminated on the end of the cable which bypasses the noise.

***The timecode connections should be made with shielded cable, if possible, especially if long distances are separating the RC1000 and the remote display(s).***

### 2.3.1 Output Timecode — Single Remote Display

Channel A is the Primary Time Code Output. Connect the remote timecode display (such as TCDS26) to primary time code output at pins 10 ,11, and 23 on the external 25-pin I/O connector, using the guidelines for SE and DIFF signals of the prior section.

The DISPLAY key will now allow both channels to be viewed remotely on the single display.

### 2.3.2 Output Timecode — Dual Remote Displays

Channel B is the Secondary Time Code Output.

Connect the **first** remote timecode display (Channel A) to primary TC output as described in the previous section for single remote display.

Connect the **second** remote timecode display (Channel B) to secondary TC output using Pins 12,13, and 25 on the I/O connector, using the guidelines for SE and DIFF signals of the prior section.

The SHIFT-DISPLAY key should now be pressed to lock the outputs on Channel A and Channel B, respectively, assuming the 'A' LED is lighted on the DISPLAY key.

The RC1000 can independently generate these time code formats on each channel based upon its current reference time or time code input:

SMPTE 24, 25, 30, or drop frame

### 2.3.3 Input Timecode — Time Reference Input

If a more precise timecode source is available, such as the, it should be connected to the RC1000 timecode reference input. This will then give the RC1000 the same accuracy as the master source and will frame-lock the two together. The input time code may be either single ended (+TC & Return/Ground) or differential (+TC, -TC, Return/Ground). Consult the DB25 pinout table for determining the proper input pins for each case.

Connect the time code from your time code source to primary time code input at pins 8 ,9, and 21 on the external 25-pin I/O connector, using the guidelines for SE and DIFF signals of the prior section.

The input time code format will be automatically detected and locked to by the time code reader, and an automatic gain control circuit will adjust the input time code amplitude.

The RC1000 can auto-detect and lock to these time code input formats:

SMPTE 24, 25, 30, or drop frame  
IRIG-B0 DCLS, and IRIG-B1 AM

## 2.4 General Purpose I/O Connections

### 2.4.1 General Purpose Output

Two independently programmable general-purpose outputs (GPO) are available on the RC1000. Each GPO uses an opto-isolator for isolation; and is protected from overvoltage by a varistor. The normally open (NO) open circuit voltage of each opto-isolated output is +4VDC, with an output resistance of 1k $\Omega$ .

Connect the GPO #0 at pins 18 and 6, and GPO #1 at pins 19 and 7, respectively, on the external 25-pin I/O connector.

Each GPO and may be programmed to be a single-shot (1 time) active low output or trigger based upon a timer event from either Channel A or Channel B time code output. The timer event can be scheduled to be at the start of a count, at the end of a count, or at a certain HH:MM:SS.FF in the count..

When active the output voltage will drop to OVDC (signal reference) for the duration specified in number of SMPTE time code frames. The exact duration length is dependent upon the output time code selected for the channel that triggers the output, and the number of frames selected. Active duration can range from 1 to the maximum frames per second (24, 25, 30), or 1 second.

The RC1000 be programmed to output an active low signal for a duration of to these time code input formats:

SMPTE (fps)	Frame Duration (mSec)	Min Active Time (mSec)	Max Active Time (sec)
24	41.7	41.7	1
25	40	40	1
30	33.3	33.3	1

More information about programming and using the general-purpose outputs (GPO' s) may be found in section 3.18

## 2.4.2 General Purpose Input

Two independently programmable general-purpose inputs (GPI) are available on the RC1000. Each GPI uses an opto-isolator for isolation; and is protected from overvoltage by a varistor, and Zener diode clamp. The normally open (NO) open circuit voltage of each opto-isolated input is +4VDC, with an input resistance of 300  $\Omega$

Connect the GPI #0 at pins 16 and 4, and GPI #1 at pins 17 and 5, respectively, on the external 25-pin I/O connector.

Each GPI and may be programmed to be an active low input or trigger based upon an external event (such as a momentary push button switch, a pedal switch, or dry contact relay closure) and initiate a count-down or count-up timer event on either Channel A or Channel B time code output. Each closure will immediately restart the count from the initial PRESET value.

The nominal closure duration specified by the minimum frame duration of the time code.

SMPTE (fps)	Frame Duration (mSec)	Nominal Closure Time (mSec)
24	41.7	41.7
25	40	40
30	33.3	33.3

More information about programming and using the general-purpose outputs (GPI' s) may be found in section 3.19

## 2.5 RS232 Serial Port Connection

An RS232 serial port has been provided on the RC1000 for use with dummy displays that utilize the RS-232 data to display time, or a monitoring computer. The RS232 port will output the time/count data from the active channel.

Pins 2,3, and 15 are reserved for the RS232 port. See Table 1. If you have difficulty receiving and monitoring the RS232 data try swapping pins 2 and 3 to create a NULL modem interface, and verify your settings on the connected device.

**RS232 data is output at 9600 Baud, 8 Bits, 1 Stop, No Parity**

More information about sending time to a remote display via the RS232 may be found in section 3.5

## **2.6 Connecting Power**

### **2.6.1 DC Power**

The RC1000 may be powered by a DC voltage of +8VDC to +28 VDC. An AC to DC power supply has been provided with a locking connector. Connect the threaded locking connector of the AC to DC power supply to the connector marked DC IN of the RC1000. Plug the AC to DC power supply plug into an appropriate AC power receptacle.

The power consumption of the unit is mA at +8 Vdc DC input

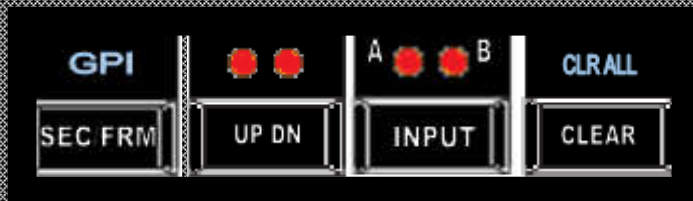
### **2.6.2 Power over Ethernet (PoE)**

The RC1000 may also be powered by PoE (Power over Ethernet) using the spare pins of the Ethernet cable per the IEEE 802.3af Standard. Connect one end of the Ethernet cable to the RC1000 connector labeled ETHERNET. Connect the other end of the Ethernet cable to the PoE output port of an appropriate +48 VDC IEEE 802.3af compliant Power over Ethernet switch, PoE router, or single port PoE injector.

### **2.6.3 Dual (Redundant) Power**

The RC1000 may also be simultaneously powered by both PoE (Power over Ethernet) using the spare pins of the Ethernet cable per the IEEE 802.3af Standard, and by DC power using the DC Power Input. In the event that one of the power sources is not available, the alternate source will continue to power the RC1000. This feature may be advantageous when a critical application is required such as remotely triggering count events.

### 3 Operation



## Key Functions

A brief explanation of each key is given below followed by the corresponding shifted (SHIFT) function of that key.

**DISPLAY:** switches the channel to be sent to the RS232 port

**SHIFT-DISPLAY:** automatically locks the DISPLAY key in the current position

**CHAN:** changes the active channel. The active channel is indicated by the LEDs located on the CHAN key.

**SHIFT-CHAN:** locks the CHAN key on the active channel and prevents any additional switching of channels. This function may be un-locked at any time by again pressing the SHIFT-CHAN combination.

**SEC/FRM:** shifts the currently active channel between the HH:MM:SS and MM:SS.FF display.  
**GPI (SHIFT-SEC/FRM):** used to program the General Purpose Interface (GPI) inputs and outputs.

**UP/DN:** indicates the direction of the timing sequence. The LED above either the UP or DN label indicates the direction of the sequence in the active channel.

**SHIFT-UP/DN:** instantly changes the direction of the currently active channel

**INPUT:** selects the input SMPTE/EBU timecode (if available) for use on a particular channel.  
**SHIFT-INPUT:** activate/deactivate the Return-to-Input feature

**CLEAR:** clear keypad data entries from the active channel display and correct keypad data entry mistakes (edit mode).

**CLR ALL (SHIFT-CLEAR):** clears the currently active channel to all dashes.

## Key Functions (continued)

A brief explanation of each key is given below followed by the corresponding shifted (SHIFT) function of that key.

PRESET: allows sequence programming and recall

+ (Plus): add time addition calculations

INC (SHIFT +): increment the time by either one second or one frame

- (Minus): subtract time subtraction calculations.

DEC (SHIFT -): decrement the time by one second or one frame

START/STOP: functions as an “enter”, “start” & “pause” key on the active channel. Serves as an “equals” key when performing time calculations

FOLLOW DUAL (SHIFT-START/STOP): enters the sequence into the follow buffer to stack (chain) sequences. Operate like the START/STOP key, except it will operate simultaneously on both channels.

0 to 9: These are the data input keys arranged like a calculator keypad. The digit keys store or recall preset time sequences as programmed by the operator (PRESET mode)

SHIFT-0 to SHIFT-9: The shift digits also store or recall preset time sequences (PRESET mode).

Special Functions:

SHIFT-0: Shows SMPTE frame rate generation on selected channel. Pressing + key allows selection of available FPS.

SHIFT-1: Used to change the local display brightness, from brightest to dimmest, in small decrements. A total of 15 brightness levels are available.

SHIFT-2: Shows the output time format. Pressing + key allows selection of either UTC or Local.

SHIFT-3: Shows the output hourly time format. Pressing + key allows selection of either 12 hour or 24 hour.

SHIFT-4: Used to immediately transfer or transpose Channel A to Channel B, and vice versa.

SHIFT-5: Not used.

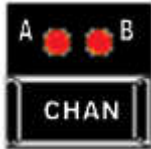
SHIFT-6: Not used.

SHIFT-7:RS-232 Port format , Pressing + key allows selection of either HH:MM:SS or HH:MM:SS:FF .

SHIFT-8: Displays firmware version and release date. Performs key test (in conjunction with Telnet command).

SHIFT-9: This toggles the leading zero blanking control of the selected channel. (Note: remote time displays are not changed.)

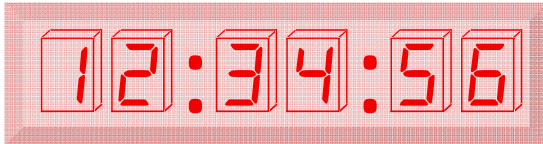
### 3.1 Entering Time and Direction



Select channel A or B using the CHAN button.



Select display format, either hours:minutes:seconds (SEC) or minutes:seconds:frames (FRM)



Enter the time via the keypad in hours:minutes:seconds



or minutes:seconds:frames.



*Note: If a mistake occurs while entering the time, press the CLEAR button, and reenter the time*



Select the direction.

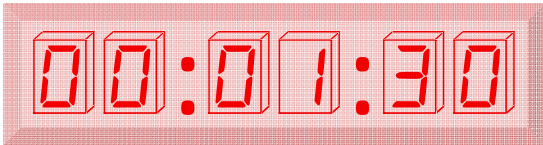


Press START/STOP to start the timer

S



## 3.2 Programming PRESETs



Enter the time via the keypad



Select the direction.



Select the PRESET mode  
The LED will start flashing.

A total of 20 programmable memory locations or 'presets' are available.



To select a memory location, for the first 10 programmable presets, press its corresponding number from 0 to 9,

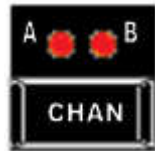


or

for memory locations 10 to 19, simultaneously press and hold the SHIFT key and press its corresponding key number 0 to 9. (e.g. press SHIFT and 6).

The PRESET light will stop flashing to indicate that the memory location has been selected.

### 3.3 Recalling PRESETs



Select channel A or B.



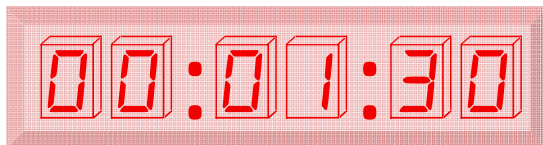
Select PRESET mode. The LED will illuminate.



Select the memory location as previously described above in "Programming Presets", using (0 - 9)



for memory locations 10 to 19,  
simultaneously press the SHIFT key and its corresponding  
key number 0 to 9.  
(e.g. press SHIFT and 6).



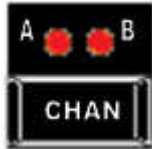
The PRESET light will stay illuminated, and the selected  
channel will have the memory location loaded and shown  
on the display.



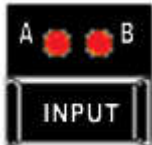
Press START/STOP to start the timer

## 3.4 Elapsed Time

### 3.4.1 Using Input Time Code



Select channel A or B.

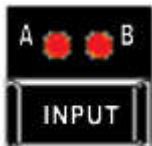


Input timecode. The counter will accept timecode and display it on the selected channel.

\*Note: input timecode is only valid for timecode clocks, network (NTDS) clocks will only display count information, or network time

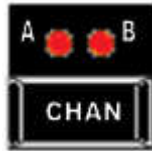


Mark the elapsed time (the counter will stop counting).



Return to timecode

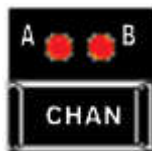
### 3.4.2 Using 2 Channels



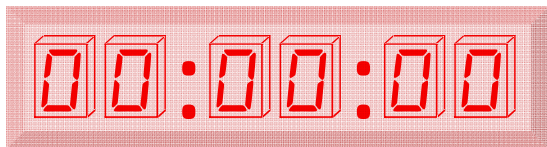
Select channel A or B.



Press CLEAR, or CLR ALL (SHIFT and CLR )



Select the other channel.



Enter the start time



Select channel UP or DOWN

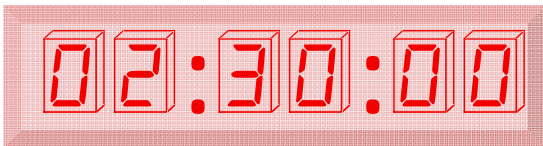
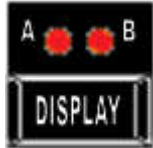


Press START/STOP. The counting will begin in the direction selected.



Mark the time; repeat. The current channel will show the elapsed (marked) time, while counting will continue in the other channel.

### 3.5 Sending Time to Remote Display with RS-232



Display of active channel



Remote RS232 display (or other DTE )

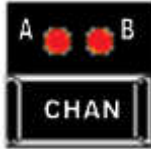
The display button will route the RS-232 output from which ever channel is active, to a remote display or other Remote Terminal Equipment (RTE) device with RS-232 communications.



Note: The format may be changed from HH:MM:SS to HH:MM:SS:FF on the serial port by pressing the SEC/FRM button.

## 3.6 Stopping and Restarting (Pause)

### 3.6.1 One Channel



Select the channel.

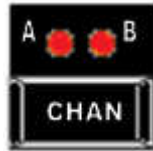


Press START/STOP.

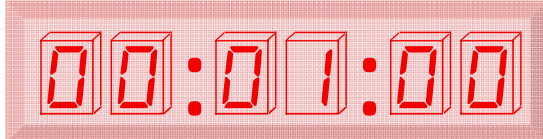


Press START/STOP again to restart

### 3.6.2 Two Channels Simultaneously



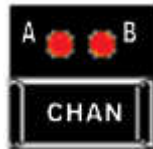
Select the channel.



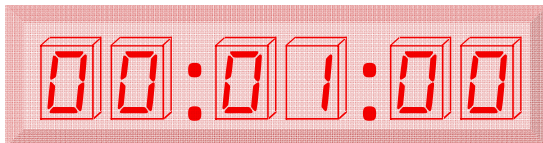
Enter the start time via the keypad or PRESET.



Select the direction.



Select the other channel.



Enter the start time via the keypad or PRESET.



Select the direction.



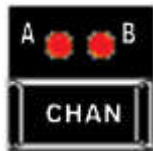
Start both channels by pressing START/STOP.

### 3.6.3 Stopping Two Channels Simultaneously



Stop both channels by pressing SHIFT and START/STOP.

### 3.7 Reversing the Direction of the Count

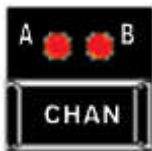


Select the channel.

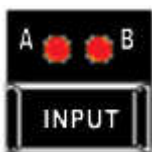


Reverse the direction by pressing SHIFT and UP/DN

### 3.8 Displaying Input Timecode (Input Timecode Required)



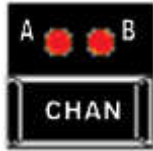
Select the channel.



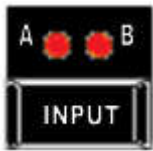
Press INPUT once to display the time. Press again to turn off the input and continue counting.



### 3.9 Countdown to End of Program (Input Timecode Required)



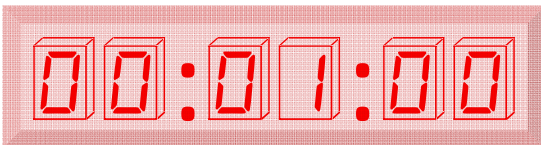
Select the channel.



Input time code



Press the - key once.

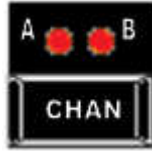


Enter the end of the program via the keypad or PRESET (must be greater than the current time from the input timecode).

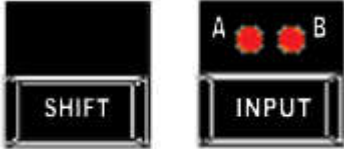


Complete your selection by pressing START/STOP.  
The result is automatically started as a down count.

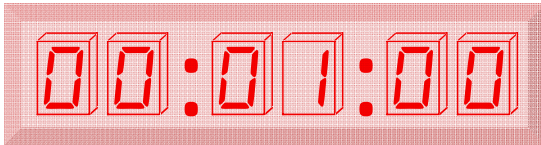
### 3.10 Returning to Input Timecode After Countdown (Input Timecode Required)



Select the channel.



Simultaneously press the SHIFT and INPUT keys. The LED of the corresponding channel will be flashing

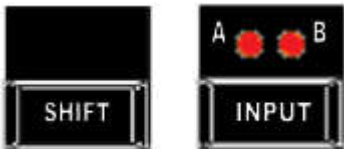


Enter the time via the keypad or PRESET and if necessary, select the down direction.



Start the countdown by pressing START/STOP. At the end of the countdown, the selected channel will display the input timecode

#### To Disable/Re-enable during Countdown



Note: If the other channel is being used (e.g. countdown, calculation, etc.), be sure to return to the desired channel, to allow the unit to return to input time code after the countdown.

To Disable during Countdown: Simultaneously press the SHIFT and INPUT keys.

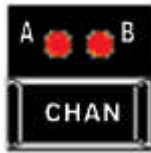
To Re-enable during Countdown: Simultaneously press the SHIFT and INPUT keys a third time.

### 3.11 Swapping Channels

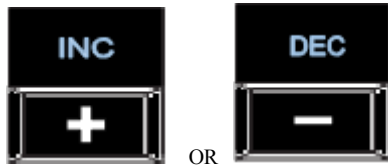


Simultaneously press the SHIFT and 4 keys to swap channels.

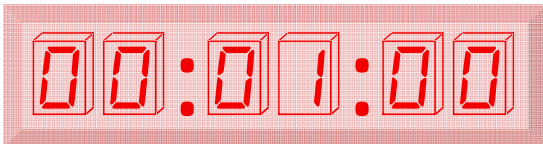
### 3.12 Adding/Subtracting Time to Existing/Running Count



Select the channel.



Select the operation, addition (+) or subtraction (-).

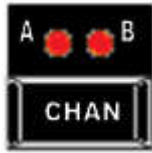


Enter the time via the keypad



Perform the operation by pressing the START/STOP key, which corresponds to an "equal" or "result" key.

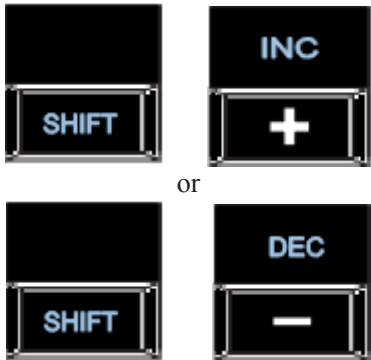
### 3.13 Adding or Subtracting Time (Small Increments)



Select the channel.



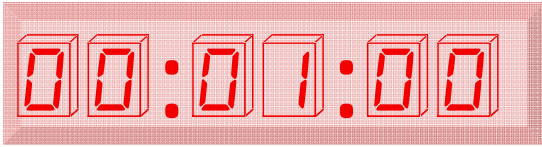
Select the display format, seconds (SEC) or frames (FRM).



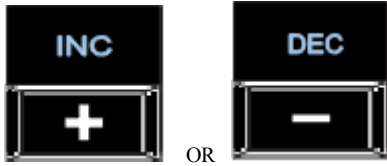
Press and Hold the SHIFT key, then select either INC (+) or DEC (-).

Each time the key combination of SHIFT INC or SHIFT DEC is pressed, time is added or subtracted according to the smallest increment on display (seconds or frames).

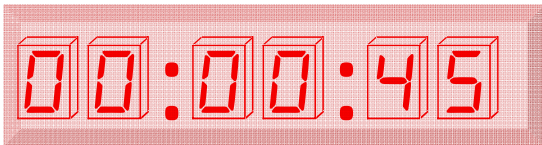
### 3.14 Calculator



Enter the time via the keyboard



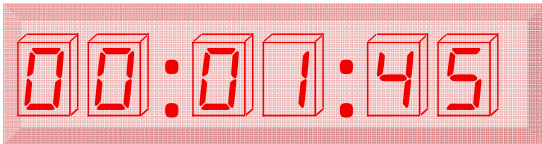
Select the operation:  
addition (+) or  
subtraction (-).



Enter the time via the keypad. (Press CLEAR if a mistake is made.)



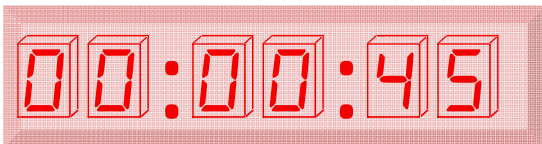
Pressing the START/STOP key will perform a total in real time. The result may be stored as a PRESET.



The resultant time will be either a sum

or

Or

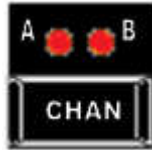


Difference of the times entered.



Return to the display of time by pressing CLEAR or press START/STOP to start the result as a new count.

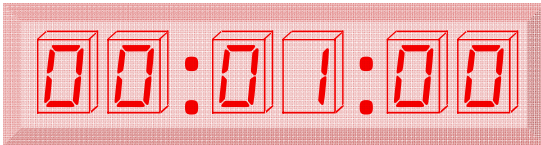
### 3.15 Sequence of Countdowns (Follow Buffer)



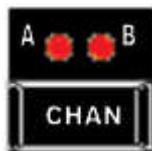
Select the channel.



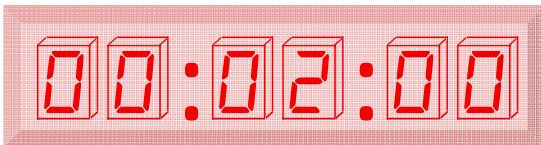
Pressing CLEAR ALL (SHIFT and CLR ALL) will clear the follow buffer and channel information.



Enter the first countdown via the keypad or PRESET



Press the CHAN button twice to complete and pause the first countdown



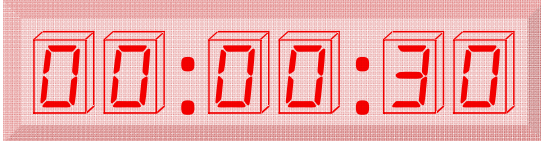
Enter the second countdown via the keypad or PRESET



Simultaneously press both the SHIFT and START/STOP keys to complete the second countdown.

If more counts are desired in the sequence, continue as shown. Otherwise, skip to the end.

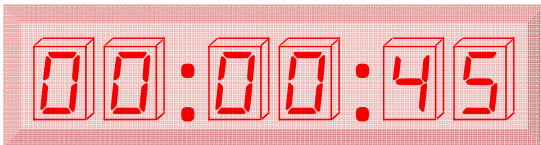
### 3.15 Sequence of Countdowns (Follow Buffer) - (Continued)



Enter the third countdown via the keypad or PRESET



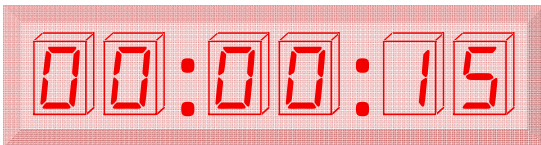
Complete the entry by pressing SHIFT and START/STOP.



Enter the fourth countdown via the keypad or PRESET.



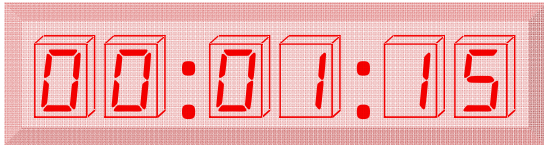
Complete the entry by pressing SHIFT and START/STOP.



Enter the fifth countdown via the keypad or PRESET



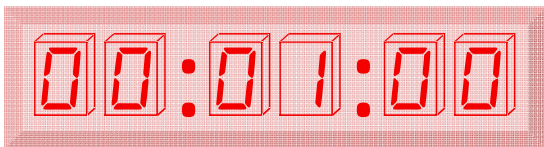
Complete the entry by pressing SHIFT and START/STOP



Enter the sixth countdown via the keypad or PRESET.



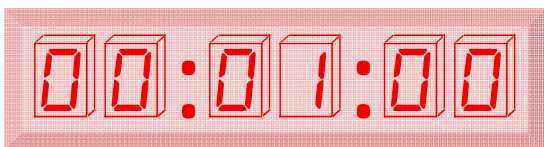
Complete the entry by pressing SHIFT and START/STOP



Enter the seventh countdown via the keypad or PRESET.



Complete the entry by pressing SHIFT and START/STOP.



Enter the eighth countdown via the keypad or PRESET.



Complete the entry by pressing SHIFT and START/STOP.

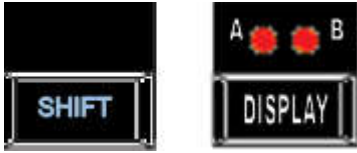


Start the sequence: The first sequence entered and that currently being displayed

Note: While the sequence is running, countdowns may be continually added on to its end for a total of up to eight countdowns at a time.



### 3.16 Disabling Display Selection



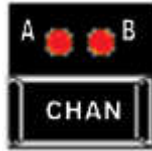
To disable, press and hold the SHIFT key, and press the DISPLAY key. To re-enable, press both keys again.

### 3.17 Disabling channel Selection



To disable, press and hold the SHIFT key, and press the CHANNEL key. To re-enable, press both keys again.

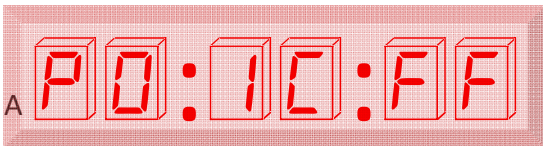
### 3.18 Programming GPI Outputs



When programming GPI outputs or inputs, any running count will be paused. Remove all GPI connections to the unit before programming. A total of two GPI outputs can be programmed. These are: GPI output programs apply only to the channel in use when they are programmed. You must set the channel to the one you wish to trigger the output.



Simultaneously press both the SHIFT and [SEC/FRM] GPS keys to program output #1.



The two line LED display provides information and entry for the port and settings.

Refer to the upper line of LEDs:

The two leftmost LED digits indicate the port type.

In this example PO indicates output port.

The middle two LED digits indicates the port number

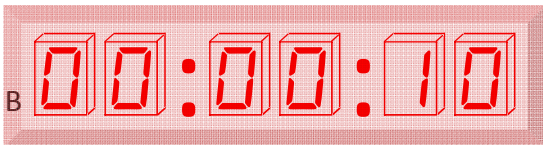
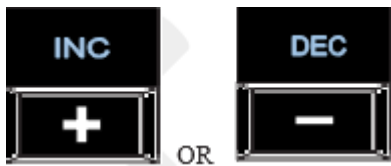
(valid port entries are 0 and 1) and C (valid channel

entries are A or B, selected with the CHAN button)

indicates channel being assigned to that output port.

The rightmost LED digits FF indicates the duration of

contact closure in a two digit number of frames. Valid entries for duration are (01 to 24 frames).



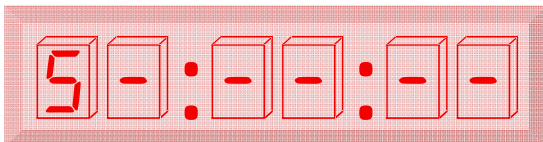
To change the duration, select the INC or DEC key

depending on whether an increase or decrease is

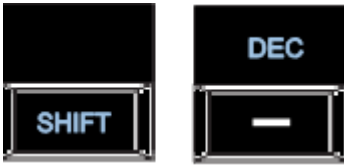
desired.



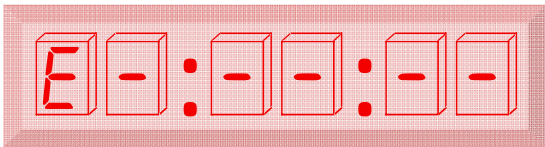
Channel B indicates the activation time, which is entered via the keypad only



Simultaneously pressing both the SHIFT and + keys to program GPI output to activate at the start of the count.



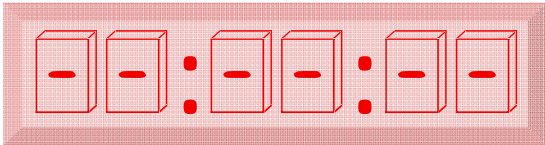
Pressing the SHIFT and - key will cause the GPI output to activate when the count reaches zero (e.g. end of countdown).



E in the display indicates “End” of count.



Simultaneously press both the SHIFT and SEC/FRM keys to program output #1.

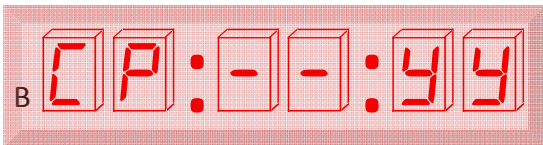
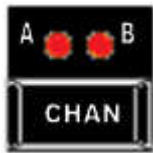
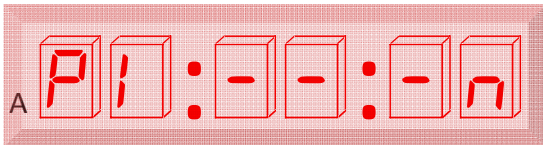


Execute as per output #1.  
Note: Pressing the SHIFT and GPI keys a second time (e.g. as when programming output #2 after output #1) will store the previous output program (e.g. output #1) into memory.



Pressing the SHIFT and CLEAR keys will exit at any time. Current GPI output status will not be stored into memory.

### 3.19 Programming GPI Inputs



Remove all GPI connections before programming. There are a total of 2 GPI inputs. The trigger of the GPI input loads and executes the preset into the selected channel. Therefore, the presets must be programmed prior to the programming of the GPI input. These are accessed after the GPI outputs and are programmed as follows:

Enter the Programming GPI input mode by pressing the SHIFT and GPI keys three times (YY may only be key number 1 to 10 for the PRESET recall option.)

The left two LEDs of channel A LED display line indicate the mode is GPI input.

The rightmost LED of channel A LED display line “n” indicates the number of the GPI input that is being programmed. (n = 1 or 2) To select GPI input #2, press the SHIFT + GPI keys an additional time.

The channel “C” will show in the left most digit of the channel B display line. Change the channel to the one the preset should be placed.

PRESET recall mode is indicated by the P in the Channel B display. Only PRESET sequences may be recalled and started. When in Programming Port Input mode, the PRESET key will be illuminated.

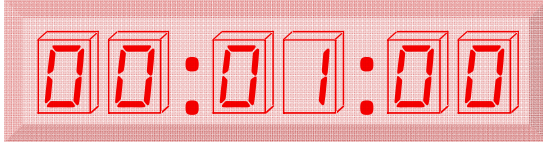
Enter the Preset number by using the numeric keys. (YY may only be key numbers 00 to 19 for the PRESET recall option.)

Press SHIFT + GPI key to enter the program. This key sequence will also step to the next available programmable port.

Press the SHIFT + CLR ALL to exit the programming mode and return to normal display.

**Example 1. Configure GPI input 1 to trigger a count down from 60seconds on Channel A**

Step 1. Load Preset Buffer 1 with a count down from 60 seconds



Type 1 then 0 then 0 to specify a start time of 1 minute and 00 seconds.

Alternately, specify a start time of 60 seconds  
Note that the amount in seconds may also be entered, as the RC1000 will convert to the proper format.

Press the Up/Dn direction key to select Down direction.

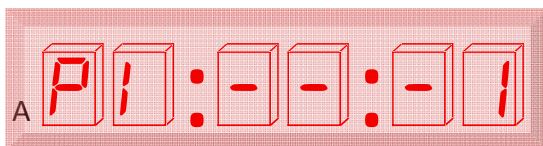
Select PRESET mode. The LED will start flashing.

Press the 1 Key to specify Preset Location 1.  
The PRESET Key light will stop flashing to indicate that the Preset Buffer has been programmed.

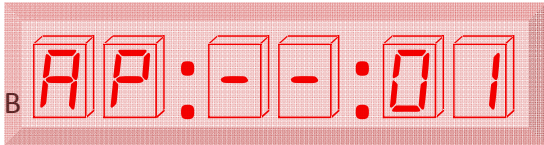


Step 2. Program GPI input 1 to trigger Preset 1 on Channel A

While holding Down the SHIFT key, Press the GPI Key 3 times to select GPI 1. (The 4th time selects GPI 2)



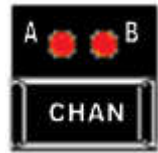
Channel A's LED display continues to display PI---1 indicating that GPI input 1 is being programmed on GPI 1



When in Programming Port Input mode, the PRESET key will be illuminated.



Press the 1 Key to specify Preset Location 1.



Press the CHAN key to select channel A. This will apply the 60 second count down to the output count on channel A.



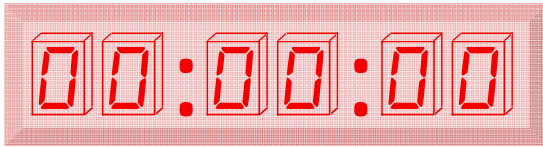
While holding Down the SHIFT key, Press the GPI Key once to enter the program for GPI #1 (and to program the next input if desired.)



Press SHIFT + CLR ALL to exit programming mode.

W

**Example 2. Configure GPI input 2 to trigger a count up from 0seconds on Channel B**



Step 1. Load Preset Buffer 0 with a count up from 0 seconds

Clear the display. Then press the 0 (zero) key. Alternately, specify a start time of 00:00:00

Press the Up/Dn direction key to select UP direction.

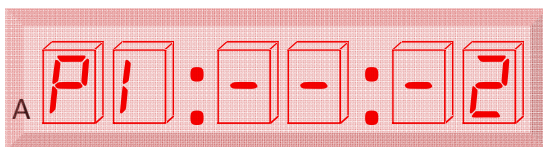
Select PRESET mode. The LED will start flashing.

Press the 0 Key to specify Preset Location 0. The PRESET Key light will stop flashing to indicate that the Preset Buffer has been programmed.

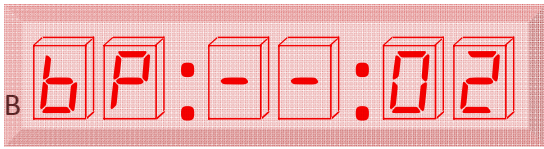


Step 2. Program GPI input 2 to trigger Preset 0 on Channel B

While holding Down the SHIFT key, Press the GPI Key 4 times to select GPI 2.



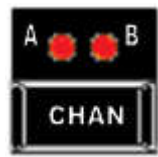
Channel A's LED display continues to display PI---2 indicating that GPI input 2 is being programmed on GPI 2



When in Programming Port Input mode, the PRESET key will be illuminated.



Press the 0 Key to specify Preset Location 0.



Press the CHAN key to select channel A. This will apply the count up from 0 of preset 0 to the output count on channel B.



While holding Down the SHIFT key, Press the GPI Key once to enter the program for GPI #2 (and to program the next input if desired.)



Press SHIFT + CLR ALL to exit programming mode.

W



### 3.20 Brightness of Display



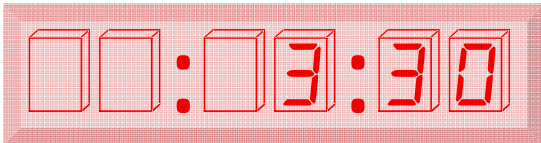
Pressing the SHIFT and 1 keys, multiple times will adjust the brightness level of the display. There are 15 levels of brightness.

### 3.21 Leading Zero Blanking



Pressing the SHIFT and 9 keys prior to entering the time will remove the zeros before a number on the display.

Note: Leading zero function will not affect the remote displays



### 3.22 Re-enabling Lead Zeros



Pressing the SHIFT and 9 keys again will re-enable the zeros before a number on the display.

